

## A2.6 SOILS

Approximately 40 percent of the total area of the Fort Irwin Military Reservation is underlain by alluvial and lacustrine deposits. These deposits reach thicknesses of hundreds of feet in the central portions of the valleys and basins. The sediments consist of various mixtures of clay, silt, sand, gravel, cobbles and boulders, cemented to varying degrees by caliche. The remaining 60 percent of the area is underlain by bedrock, at or near the surface. The bedrock consists mostly of granitic and metavolcanic rocks, with some meta-sedimentary and sedimentary rocks.

Three soil types predominate on the Fort Irwin Reservation. The soil derived from granitic rocks is a silty sandy gravel. That derived from decomposing volcanic rocks is a silty gravel. The older, dissected alluvial deposits and terrace gravels are very rocky soils. Both the volcanic and granitic derived soils have medium to low permeability.

Desert pavement, a residual layer of large soil particles left on the ground surface after the finer particles have been carried off by wind and water, is developed over virtually all soil surfaces (Barley, 1975). The surface of lag gravels is also called desert armor, as once developed, the armor protects the desert surface against erosion. The lag gravels that make up the desert pavement or armor are often brightly polished from coatings of oxide of iron and manganese, giving a shiny appearance known as desert varnish.

## A2.7 VEGETATION

### A2.7.1 Plant Communities

Temperature, precipitation-evapotranspiration ratio, and soil type result in four distinct plant communities on Fort Irwin (Munz and Keck, 1949). Figure 5 depicts the ecological location of these communities. They are as follows:

- o Alkali Sink Community: In poorly drained alkaline flats and adjacent to playas, such as Leach Lake, Langford Well Lake, Goldstone Lake, and Bicycle Lake. Major species include cattle spinach (Atriplex polycarpa), parry saltbush (Atriplex parryi), and desert holly (Atriplex hymenelytra). Due to the prevalent dryness of the playas on Fort Irwin, this plant community is not well developed. The playas are barren.
- o Creosote Bush Scrub Community: In well drained soil of slopes, fans, and valleys. Although usually located below 3500 feet, due to a scant precipitation level, it

can be found as high as 5500 feet. About 85 percent of Fort Irwin is covered by creosote bush scrub. Major species include creosote bush (Larrea divaricata or Larrea tridentata), cheesebush (Hymenoclea salsola) and burrobrush (Ambrosia dumosa).

- o Shadscale Scrub Community: In heavy soil of mesas and flats at 3000 to 6000 feet. It is often located between creosote bush scrub and the higher Joshua tree woodland, and in the Fort Irwin vicinity it intergrades with creosote bush scrub. Major species include shadscale (Atriplex confertifolia), spiny hopsage (Grayia spinosa) and winter fat (Eurotia lanata).
- o Joshua Tree Woodland: On well drained mesas and slopes at higher elevations of Fort Irwin, located from 3000 feet to more than 5000 feet. Major species include Joshua tree (Yucca brevifolia), Mojave yucca (Yucca schidigera), blackbush (Coleogyne ramosissima), junipers (Juniperus sp.), paper bag bush (Salazaria mexicana) and California buckwheat (Eriogonum fasciculatum). On Fort Irwin, some Joshua Tree Woodland is found in the southwest corner of the reservation and may be found in the Granite Mountains.

While there has been no detailed vegetation mapping on Fort Irwin, a 100+-square-mile intensive study area along the western boundary of Fort Irwin with the Naval Weapons Station was censused in 1975 (Barling, 1975). The location of the base camp and 100+-square-mile study area sampled in 1975 are shown in Figure A-2. The plant species listing generated from the study is presented in Table A-10.

By far, the predominant plant community on Fort Irwin is Creosote Bush Scrub. It is found between 2000 and 5500 feet elevation on the well drained, slightly alkaline soils of low hills, pediments, and upper valleys of the Fort. Vegetation is very sparse, covering no more than 20 percent of the surface. The remaining ground is protected by desert pavement and rock.

The dominant species in this plant community is Creosote Bush (Larrea divaricata) with a frequent co-dominant of Burrobrush (Ambrosia dumosa). Shadscale and spiny hopsage also frequently occur. Diversity and density of the community are highly variable according to elevation, availability of soil moisture, and soil composition.

Within the creosote bush scrub community, there is some variation in the dominant species depending upon soil conditions. On washes and sandier soils, cassia (Cassia armata),

Table A-10

Plant Species List: BOLD EAGLE '76

*Agavaceae*

*Yucca brevifolia* Engelm. in wats.

*Asclepiadaceae*

*Asclepias erosa* Torr.

*Sarcostemma hirtellum* (Gray) R. Holm

*Asteraceae*

*Ambrosia dumosa* (Gray) Payne

*Brickellia arguta* Rob.

*Chrysothamnus paniculatus* (Gray) Hall

*Coreopsis bigelovii* (Gray) Hall

*Encelia virginensis* A. Nels. ssp *actonii* (Elmer) Keck

*Haplopappus cooperi* (Gray) Hall

*Hymenoclea salsola* T. & G.

*Machaeranthera tortifolia* (Gray) Cronq. & Keck.

*Psathyrotes annua* (Nutt.) Gray

*Senecio douglasii* DC. Var. *monoensis* (Greene) Jeps.

*Stephanomeria pauciflora* (Torr.) Nutt.

*Tetradymia axillaris* A. Nels.

\**Viguiera reticulata* S. Wats.

*Boraginaceae*

*Amsinckia tessellata* Gray

*Cryptantha pterocarya* (Torr.) Greene

*Brassicaceae*

*Descurainia* sp. Webb & Berthel.

*Ledpidium fremontii* Wats.

*Stanleya pinnata* (Pursh) Britton

*Cactaceae*

*Echinocactus polyancistrus* Engelm. & Bigel.

*Echiocactus polycephalus* Engelm. & Bigel.

*Echinocereus englemannii* (Parry) Ruempl.

*Opuntia basilaris* Engelm. & Bigel.

*Opuntia echinocarpa* Engelm. & Bigel.

*Opuntia echinocarpa ramosissima* Engelm.

Plant Species List (continued)

*Chenopodiaceae*

*Atriplex canescens* (Pursh) Nutt.  
*Atriplex confertifolia* (Torra Frem) Wats.  
*Atriplex hymenelytra* (Torr.) Wats.  
*Atriplex parryi* Wats.  
*Atriplex polycarpa* (Torr.) Wats.  
*Eurotia lanatum* (Pursh) Moq.  
*Salsola kali* L. Var. *tenuifolia* Tausch.  
*Suaeda fruticosa* (L.) Forsk.

*Cucurbitaceae*

*Cucurbita Palmata* Wats.

*Ephedraceae*

*Ephedra nevadensis* Wats.

*Euphorbiaceae*

*Eremocarpus setigerus* (Hook.) Benth.  
*Euphorbia* sp. L.

*Fabaceae*

*Cassia armata* Wats.  
\**Dalea arborescens* Torr. ex Gray.  
*Lotus rigidus* (Benthe) Greene  
*Prosopis juliflora* (SW.) DC V. *Torreyana* L. Benson

*Geraniaceae*

*Erodium cicutarium* (L.) L'Her

*Hydrophyllaceae*

*Phacelia* sp. Juss.

*Krameriaceae*

*Krameria parvifolia* Benth.

*Lamiaceae*

*Marrubium vulgare* L.  
*Salazaria mexicana* Torr.  
*Salvia carduacea* Benth.  
*Salvia columbariae* Benth.  
*Salvia mohavensis* Greene

Plant Species List (continued)

*Loasaceae*

*Eucnide urens* (Gray) Parry  
*Mentzelia* sp L.  
*Petalonyx thurberi* Gray

*Malvaceae*

*Sphaeralcea ambigua* Gray

*Nyctaginaceae*

*Mirabilis bigelovii* Gray. *V. retrorsa* (Heller) Munz.

*Onagraceae*

*Camissonia decorticans* (H. & A.) Greene *V. desertorum* Munz

*Poaceae*

*Bromus tectorum* L.  
*Distichlis spicata* (L) Greene *V. divaricata* Beetle  
*Oryzopsis hymenoides* (R. & S.) Ricker  
*Panicum* sp. L.  
*Stipa speciosa* Trin. & Rupr.

*Polygonaceae*

*Chorizanthe brevicornu* Torr.  
*Chorizanthe rigida* (Torr.) T. & G.  
*Erigonum fasciculatum* Benth. ssp. *polifolium* (Benth.) S. Stokes  
*Erigonum inflatum* Torr. & Frem.  
*Erigonum nidularium* cov.  
*Erigonum trichopes* Torr.

*Rubiaceae*

*Galium stellatum* Kell. ssp. *eremicum* (Hilend & Howell) Ehrend.

*Rutaceae*

*Thamnosma montana* Torr. & Frem.

*Solanaceae*

*Lycium andersonii* Gray  
*Lycium cooperi* Gray  
*Nicotiana trigonophylla* Dunal in A. DC  
*Physalis pruinosa* L.

Plant Species List (continued)

*Tamaricaceae*

Tamarix sp. L.

*Zygophyllaceae*

Larrea tridentata Sesse' & Mocino.

Plant names and identification from:

A California Flora by Phillip A. Munz, combined edition 1973.

Other manuals referred to:

A Flora of Kern County by E. C. Twisselmann

An illustrated Manual of California Shrubs by Howard E. McMinn

Desert Wildflowers by E. C. Jaeger

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\* Threatened or regional endemic species.

Source: Barling, T., 1975. Final Environmental Impact Assessment  
Bald Eagle 1976. China Lake, California: Naval Weapons Center.



cheesebush (Hymenoclea salsola), and saltbush (Atriplex polycarpa) are dominants. Dominant species along a gradient from well drained slopes to washes or sandy areas change gradually from creosote bush-burro bush (Larrea ambrosia) association to cassia, cheesebush, or saltbush (Cassia, Hymenoclea, Salsola, or Atriplex polycarpa), dominant either individually or in association with either or both of the other species.

The density of plant species was quite variable, both within the study area as a whole and within a particular association. In the roughly 100-square-mile study area, density and divergence of species was the greatest on alluvial deposits of the Granite Mountains and associated canyons and washes. Maximum ground coverage measured was 21 percent in larrea-Ambrosia association. Maximum ground coverage was 10 percent in Atriplex-Hymenoclea association where some of the ground was bare from wash action. Barling reports also that the density of vegetation on volcanically derived soil was generally sparser.

Cottonwood, willow, and desert catalpa (desert willow) trees occur around some springs.

#### A2.7.2 Rare Plant Species

Within the creosote bush communities, three rare wild flower species (Bureau of Land Management, 1974) occur. Mojave indigo bush (Dalea arborescens); lax-flowered locoweed; and devil's cactus. Field studies (Barling, 1975) along the western boundary of Fort Irwin resulted in the identification of numerous Mojave Indigo bush plants, which has been proposed for the federal threatened species list. The plants were sighted immediately outside the boundaries of the Fort. The approximate location of these plants is shown on Figure A-2.

A2.8 WILDLIFE (Discussion of wildlife on Fort Irwin Reservation based upon a survey of reports of field work performed in 1975 on Fort Irwin by biologists from China Lake Naval Weapons Center, on discussions with desert naturalists, including Mr. Robert Vernoy of the California Department of Fish and Game, and on a study of the Mojave ground squirrel by Edwin V. Wessman of the U.S. Bureau of Land Management in 1977.)

##### A2.8.1 General

The principal vertebrate species in the Fort Irwin area are rodents, reptiles and birds. Some large mammals also are known to frequent the reservation, such as Desert Bighorn Sheep, coyote, bobcat, kit fox and badger. A list of vertebrate species known or expected to occur on the Fort Irwin reservation is presented in Table A-11.



Table A-11.

LIST OF VERTEBRATE SPECIES KNOWN OR EXPECTED TO  
INHABIT THE FORT IRWIN MILITARY RESERVATION

Common Name	Scientific Name	Comments
<u>Mammals</u>		
Lagomorpha		
Black-Tailed Hare	Lepus californicus	Observed 1975
Audubon Cottontail	Sylvilagus audubonii	Observed 1975
Rodentia		
Antelope Ground Squirrel	Ammospermophilus leucurus	Observed 1975
Little Pocket Mouse	Perognathus fallax	Observed 1975
San Diego Pocket Mouse	Perognathus fallus	Observed 1975
Long-Tailed Pocket Mouse	Perognathus formosus	Observed 1975
Merriam Kangaroo Rat	Dipodomys merriami	Observed 1975
Canyon Mouse	Peromyscus crinitus	Observed 1975
Southern Grasshopper Mouse	Onychomys torridus	Observed 1975
Desert Wood Rat	Neotoma lepida	Observed 1975
Mojave Ground Squirrel	Spermophilus mohavensis	Observed 1977
Botta Pocket Gopher	Thomomys bottae	-
Great Basin Pocket Mouse	Perognathus parvus	-
Panamint Kangaroo Rat	Dipodomys panamintinus	-
Great Basin Kangaroo Rat	Dipodomys microps	-
Desert Kangaroo Rat	Dipodomys deserti	-
Western Harvest Mouse	Reithrodontomys megalotis	-
Cactus Mouse	Peromyscus eremicus	-
Deer Mouse	Peromyscus maniculatus	-
Brush Mouse	Peromyscus boylii	-
Round-tailed Ground Squirrel	S.t. tereticaudus	Observed 1977
Carnivora		
Coyote	Canis latrans	Observed 1975
Badger	Taxidea taxus	Observed 1975
Bobcat	Lynx rufus	Observed 1975
Desert Kit Fox	Vulpes macrotis	Calif. Dept. of Fish & Game, Fully Protected
Gray Fox	Urocyon cinereoargenteus	-
Ringtailed Cat	Bassariscus astutus	Calif. Dept. of Fish & Game, Fully Protected
Long-Tailed Weasel	Mustela frenata	-
Chiroptera		
Little Brown Myotis (Bat)	Myotis lucifugus	-
California Myotis "	Myotis californicus	-
Yuma Myotis "	Myotis yumanensis	-

LIST OF VERTEBRATE SPECIES KNOWN OR EXPECTED TO  
INHABIT THE FORT IRWIN MILITARY RESERVATION (continued)

Common Name	Scientific Name	Comments
Long-Eared Myotis	Myotis evotis	-
Fringed Myotis	Myotis thysanodes	-
Small-Footed Myotis	Myotis subulatus	-
Western Pipistrelle	Pipistrellus hesperus	-
Big Brown Bat	Eptesicus fuscus	-
Red Bat	Lasiurus borealis	-
Hoary Bat	Lasiurus cinereus	-
Spotted Bat	Euderma maculatum	-
Lump-Nosed Bat	Plecotus townsendii	-
Pallid Bat	Antrozous pallidus	-
Brazilian Free-Tailed Bat	Tadarida brasiliensis	-
Artiodactyla		
Bighorn Sheep	Ovis canadensis nelsonii	California Department of Fish & Game, Fully Protected
Perissodactyla		
Burro (non-native)	Equus asinus	Protected P.L. 92-195
<u>Reptiles</u>		
Snakes:		
Sidewinder	Crotalus cerastes	Observed
Glossy Snake	Arizona elegans	Observed
Mojave Green Rattlesnake	Crotalus scutulatus	-
Long-Nosed Snake	Rhinocheilus lecontei	-
Rosy Boa	Lichanura trivirgata	-
Red Racer	Masticophis flagellum piceus	-
King Snake	Lampropeltis getulus	-
Western-Patch-Nosed Snake	Salvadora hexalepis	-
Shovel-Nosed Snake	Chionactis occipitalis	-
Night Snake	Hypsiglena torquata	-
Speckled Rattlesnake	Crotalus mitchelli	-
Western Blind Snake	Leptotyphlops humilis	-
Western Ground Snake	Sonora semiannulata	-
Spotted Leaf-Nosed Snake	Phyllorhynchus decurtatus	-
Utah Black-Headed Snake	Tantilla planiceps utahensis	-
Gopher Snake	Pituophis melanoleucus	-

LIST OF VERTEBRATE SPECIES KNOWN OR EXPECTED TO  
INHABIT THE FORT IRWIN MILITARY RESERVATION (continued)

Common Name	Scientific Name	Comments
Lizards:		
Zebra-Tailed Lizard	Callisaurus draconoides	Observed
Western Whiptail	Cnemidophorus tigris	Observed
Collared Lizard	Crotaphytus collaris	Observed
Leopard Lizard	Crotaphytus wislizenii	Observed
Desert Horned Lizard	Phrynosoma platyrhinos	Observed
Chuckwalla	Sauromalus obesus	Observed
Desert Spiny Lizard	Sceloporus majister	Observed
Desert Side-Blotched Lizard	Uta stansburiana	Observed
Desert Night Lizard	Xantusia vigilis	-
Desert Iguana	Dipsosaurus dorsalis	-
Tortoises:		
Desert Tortoise	Gopherus agassizi	Observed
Geckos:		
Banded Gecko	Coleonyx variegatus	-
Amphibians:		
Red-Spotted Toad	Bufo punctatus	-
Skinks:		
Glibert's Skink	Eumeces gilberti	-

A herd of several hundred wild burros ranges across the southwest portion of Fort Irwin and into Naval Weapons Center (Barling, 1977, personal communication). According to Barling, the feral burro population is thriving despite military activities on both reservations.

The Fort Irwin cantonment area supports large populations of transient and resident birds. Landscape plantings around the area provide roosting and nesting sites and water is available.

The following sections discuss the various vertebrate species known or expected to inhabit the Fort Irwin reservation (Barling, 1975 and Wessman, 1977).

- o Rodents. Field studies performed showed Merriam's kangaroo rat (Dipodomys merriami) to have a wide range and the greatest numbers in the area sampled. The Mojave ground squirrel (Spermophilus mojavensis), a rare species was observed at four different sites in Fort Irwin in 1977 (Wessman, 1977).
- o Bats. Bats were observed around caves and crevices, but no sampling was carried out. Caves and crevices serve as roosting sites and nurseries for the young. The spotted bat (Enderma maculatum) is a rare species that may be in the Fort Irwin area.
- o Carnivores. Carnivores are found on Fort Irwin primarily around springs, where they find readily available food in the form of birds and rodents. Coyote, kit fox and grey fox are usually more active after dark, but may be active in the daytime. These animals either live in caves or dig out holes in which they can escape from the heat of the day and raise their young.

Evidence of carnivores excavating around Mesquite Springs to get at water and the bodies of two coyotes which apparently died of thirst have been reported.

- o Lagomorphs. Two species of lagomorphs were observed<sup>1</sup>, one a hare and one a true rabbit. These were the black-tailed jackrabbit (Lepus californicus), a hare which was observed in alluvial fans and washes, and the audubon cottontail (Sylvilagus audubonii), a true rabbit which was observed only around Mesquite Spring. The young and adult cottontails use underground burrows for escape cover. In moist conditions, they eat tender herbs, grasses and leaves. When green feed dries up, the rabbits must eat dry food, and water becomes a necessity.

- o Desert Bighorn Sheep (Ovis canadensis). Desert bighorn sheep generally range in the eastern portions of Mono, Inyo, San Bernardino, Riverside and Imperial Counties in California. There is a resident population of desert bighorns in the Avawatz Mountains in the north-east of the Fort Irwin reservation, and biologists from China Lake Naval Weapons Center observed bighorn tracks in the southern side of the Granite Mountains. Desert bighorns inhabit higher peaks in summer and move down to lower elevations in the winter.
- o Wild Burros (Equus asinus). Feral burros are evidently present on Fort Irwin. Some scats were found, but no individuals were sighted. According to Tilly Barling of the Naval Weapons Center, a herd of feral burros ranges back and forth between the Naval Weapons Center, Randsburg Wash Test Range and Fort Irwin in the Goldstone Lake Area. Burros are very distinctive of the desert ecosystem.
- o Birds. The springs on Fort Irwin are the principal sources of water for birds. They support vegetation which provides food, roosting area, and nesting area for many bird species. Some species that do not usually drink water depend upon the foods around springs for their water intake. Most birds observed were seen in and around Mesquite and Myrick Springs (Barling, 1975).

The status of birds observed or expected to inhabit Fort Irwin (residents, migrants, winter visitors, etc.) is shown in Table A-12.

A species of some interest on Fort Irwin is the chukar, or Indian red-legged partridge (Alectoris graeca), introduced into California in 1932. This exotic game bird has rapidly filled an open niche in the desert. While this species inhabits rugged mountain ranges in the desert and can range long distances from water sources, it has become dependent upon water supply available at the Fort Irwin cantonment area. In the period between Army and California National Guard occupation of Fort Irwin, the cantonment area was uninhabited and water supplies for chukar and other species were cut off, with resultant deaths of many chukars (Bill Downey, 'U.S. Army Corps of Engineers, Sacramento District, personal communication).

- o Reptiles and Amphibians. In the 1975 field studies by the Naval Weapons Center biologists, reptiles were collected on a random manner whenever a reptile was observed.

Table A-12

## BIRDS - OBSERVED IN 1975 FIELD STUDY FOR BOLD EAGLE '76

Abundance*	Status*	Common Name	Scientific Name
0	SV	Marsh Hawk	<i>Circus cyaneus</i>
0	Rec	Prairie Falcon	<i>Falco mexicanus</i>
C	Res	American Kestrel	<i>Falco sparverius</i>
0	Res	Golden Eagle	<i>Aquila chrysaetos</i>
C	Res	Red-Tailed Hawk	<i>Buteo jamaicensis</i>
C	Res	Chukar (not native)	<i>Alectoris graeca</i>
C	Res	Morning Dove	<i>Zenaidura macroura</i>
C	Res	Roadrunner	<i>Geococcyx californianus</i>
C	Res	Burrowing Owl	<i>Speotyto cunicularia</i>
C	SR	Poor-Will	<i>Phalaenoptilus nuttalli</i>
0	SV, M	White-Tailed Swift	<i>Aeronautes saxatalis</i>
C	SR	Western Kingbird	<i>Tyrannus verticalis</i>
0	SR	Western Wood Pewee	<i>Contopus sordidulus</i>
C	Res	Say's Phoebe	<i>Sayornis saya</i>
C	Res	Horned Lark	<i>Eremophila alpestris</i>
0	M	Violet-Green Swallow	<i>Tachycineta thalassina</i>
C	Res	Raven	<i>Corvus corax</i>
C	Res	Rock Wren	<i>Salpinctes obsoletus</i>
C	Res	Bewick's Wren	<i>Thryomanes bewickii</i>
C	Res	Mockingbird	<i>Mimus polyglottos</i>
C	Res	Le Conte's Thrasher	<i>Toxostoma lecontei</i>
Ra	M	Blue-Gray Gnatcatcher	<i>Polioptila caerulea</i>
0	SR, V	Phainopepla	<i>Phainopepla nitens</i>
C	Res	Loggerhead Shrike	<i>Lanius ludovicianus</i>
C	Res	Warbling Vireo	<i>Vireo gilvus</i>
C	M	Wilson's Warbler	<i>Wilsonia pusilla</i>
C	SR, M	Bullock's Oriole	<i>Icterus bullocki</i>
C	M	Yellow-Headed Blackbird	<i>Xanthophelus xanthophelus</i>
C	Res	Brewer's Blackbird	<i>Euphagus cyanocephalus</i>
C	M	Red-Winged Blackbird	<i>Agelaius phoeniceus</i>
C	SR	Brown-Headed Cowbird	<i>Molothrus ater</i>
C	M, SV	Western Tanager	<i>Piranga ludoviciana</i>

BIRDS - OBSERVED IN 1975 FIELD STUDY FOR BOLD EAGLE '76 (continued)

Abundance*	Status*	Common Name	Scientific Name
C	M	Black-Headed Grosbeak	<i>Pheucticus melanocephalus</i>
C	Res	Sage Sparrow	<i>Amphispiza belli</i>
O	Res	Black-Throated Sparrow	<i>Amphispiza bilineata</i>

BIRDS - SPECIES NOT OBSERVED DURING 1975 FIELD  
STUDY BUT EXPECTED TO OCCUR ON FORT IRWIN

C	M, VW	Turkey Vulture	<i>Cathartes aura</i>
Ra	M	Swainson's Hawk	<i>Buteo swainsoni</i>
Ra	M	Rough-Legged Hawk	<i>Buteo lagopus</i>
O	WV	Ferruginous Hawk	<i>Buteo regalis</i>
O	Res	Gambel's Quail	<i>Lophortyx gambelli</i>
O	Res	Great Horned Owl	<i>Bubo virginianus</i>
O	M	Barn Owl	<i>Tyto alba</i>
C	SR	Lesser Nighthawk	<i>Chordeilus acutipennis</i>
C	SR	Black-Chinned Hummingbird	<i>Archilochus alexandri</i>
C	SR	Losta's Hummingbird	<i>Calypte costae</i>
O	SR	Anna's Hummingbird	<i>Calypte anna</i>
RA	M	Board-Tailed Hummingbird	<i>Selasphorus platycerlus</i>
C	SV	Rufous Hummingbird	<i>Selasphorus rufus</i>
C	WV	Common Flicker	<i>Colaptes cafer</i>
O	SV, Res	Ladder-Backed Woodpecker	<i>Dendrocopus scalaris</i>
O	SV, Res	Ash-Throated Flycatcher	<i>Miarchus cinerascens</i>
Ra	Res	Gray Flycatcher	<i>Empidonax wrightii</i>
Ra	M	Olive-Sided Flycatcher	<i>Nuttallornis borealis</i>
C	M	Tree Swallow	<i>Iridoprocne bicolor</i>
C	M	Barn Swallow	<i>Hirundo rustica</i>
C	M	Cliff Swallow	<i>Petrochelidon pyrrhonota</i>
C	Res	Cactus Wren	<i>Camphorhynchus brunneicapillum</i>
O	WV	Sage Thrasher	<i>Oreoscoptes montanus</i>
C	WV, M	Hermit Thrush	<i>Hylocichla guttata</i>
O, Ra	Res	Black-Tailed Gnatcatcher	<i>Polioptila melanura</i>

BIRDS - OBSERVED IN 1975 FIELD STUDY FOR BOLD EAGLE '76 (continued)

Abundance*	Status*	Common Name	Scientific Name
O	M	Solitary Vireo	Vireo solitarius
C	WV	Audubon's Warbler	Dendroica auduboni
Ra	M	Black and White Warbler	Miniotilta varia
O	M	Black-Throated Grey Warbler	Dendroica nigrescens
O	SV	Orange-Crowned Warbler	Vermivora celata
C	M	McGillivray's Warbler	Oporonix tolmiei
O	SR	Scott's Oriole	Icterus parisorum
Ra	M	Lazuli Bunting	Passerina amoena
C	SV	Lesser Goldfinch	Spinus psaltria
O	Res	Brown Towhee	Pipilo fuscus
C	M	Savannah Sparrow	Passerculus sandwichensis
C	WV	Oregon Junco	Junco oreganus
O	M	Chipping Sparrow	Spizella passerina
O	Res	Brewer's Sparrow	Spizella breweri
Ra	SV	Black-Chinned Sparrow	Spizella atrogularis
C	WV	White-Crowned Sparrow	Zonotrichia leucophrys
O	WV	Golden-Crowned Sparrow	Zonotrichia atricapilla

Status (Grinnell and Miller, 1944)

Res	Resident	A species fixed in a real occurrence throughout the year.
SR	Summer Resident	A species in residence during spring and summer usually nesting in the area.
SV	Summer Visitant	A species present in summer but not known to be in breeding residence.
WV	Winter Visitant	A species present during the inter-migratory fall and/or winter periods.
M	Migrant	A species seen during spring and fall migration periods.
V	Vagrant	A species occasionally seen in area outside its normal distribution area or off its usual migration route.



BIRDS - OBSERVED IN 1975 FIELD STUDY FOR BOLD EAGLE '76 (continued)

Abundance (Robbins et. al., 1966)

C	Common	A common bird may be seen most of the time or in small numbers everytime by a person visiting its habitat at the proper season.
O	Occasional	An uncommon or occasional bird may be seen quite regularly in small numbers in the appropriate environment or season.
Ra	Rare	A rare bird occupies only a small percentage of its preferred habitat or occupies a very specific limited habitat. It is usually found only by an experienced observer.

The most abundant reptile sighted was the zebra-tailed lizard (Callisaurus draconoides). Over 300 sightings were made of lizards, primarily in desert washes and alluvial fans supporting creosote bush scrub and atriplex, and along the edges of small playas.

Three other species were plentiful in the study area. Twenty-five whiptailed lizards (Cremidophorus tigris) were sighted in a wide variety of habitats. The side-blotched lizard (Uta stansburiana) was observed 15 times primarily on alluvial fans. The desert horned lizard (Phrynosoma macleayi) was seen primarily on alluvial fans at dusk and early morning.

In addition to these often sighted reptiles, one Diamond-back rattlesnake (Crotalus ruber), five leopard lizards (Crotaphytus wislizenii), one Collared lizard (Crotaphytus collaris), one chuckwalla (Sauromalus obesus), four desert spring lizards (Sceloporus magister) and one desert tortoise (Gopherus agassizi) were recorded.

#### A2.8.2 Protected, Rare and Endangered Species

Rare and endangered species of wildlife are those forms which have been nearly exterminated or are continually threatened by human population increases and associated pressures. A number of species may be present in low numbers on the Fort Irwin Reservation because, although they may be abundant in more favorable habitats, the region is at the limit of their range. Some species normally maintain sparse populations because of their unique life cycles, habitat, and dependency on other natural factors. Other species normally maintain higher population levels and would be widespread in the region were not their numbers drastically reduced by overharvest, diminished size and quality of habitat, competition with introduced species, or some combination of these and other causes. Species of undetermined status are those which one or more state or Federal agency considers unusual or threatened on a local scale but which are not necessarily rare or endangered on a wider geographic scale. Protected species are those that are fully protected under California law, but which may not presently be considered rare and endangered.

A list of species which are protected or considered unique, rare, or endangered within the vicinity of Fort Irwin is given in Table A-13. Species listed by the Department of the Interior are considered to be threatened on a national scale and receive recognition as such. Lists of this type, are continually updated by state and Federal agencies because of changes in population numbers and reevaluations of former

classifications. Several species, such as the banded gecko, may be more abundant in the nearby areas of Southwestern Arizona and Mexico while relatively rare in the immediate vicinity of Fort Irwin.

The only known populations of the Mojave ground squirrel exist in the Victorville, Barstow, China Lake and Fort Irwin region of the Mojave Desert. The Mojave ground squirrel occurs within the range of the antelope ground squirrel but they have different activity patterns which minimize competition between the two species. Mojave ground squirrels were observed at four locations in Fort Irwin in 1977 (Wessman, 1977). The Mojave ground squirrel inhabits the scattered brush of this desert region, preferring areas of sandy or gravelly soil. Accelerated urbanization and land use changes taking place in the Mojave River Basin and Antelope Valley are destroying much of its habitat; capture, possession, or sale of this animal is prohibited.

Prairie falcons (Falco mexicanus) observed on or near Fort Irwin in 1975 (Barling, 1975), frequent many habitats such as canyons, plains, deserts, and open mountain areas. They nest in bare niches of cliffs and do not tolerate any disturbance within their nesting range.

The burrowing owl (Speotyto cunicularia), on the Audobon Society Blue List of diminishing species, was observed on or near Fort Irwin in 1975 (Barling, 1975).

The desert tortoise, designated as California's state reptile, is protected by the State of California (California Administrative Code, Title 14, Section 674, added October 5, 1973) though it is not yet considered a rare or endangered species. Increasing recreational use of its western desert habitat has resulted in a severe decline in population size. One desert tortoise and several shells were sighted on or near Fort Irwin. ★

Two species, the desert horned lizard and the banded gecko, are listed as "status undetermined" by the Bureau of Land Management.

In 1973, the United States Bureau of Land Management prepared a management program report specifically related to increased recreational vehicle use of the California desert. The report indicts wildlife species whose existence could be threatened or stressed by increased recreational pressures, especially from activities of off-road recreational vehicles.

Table A-13 Protected, Rare, Or Endangered Species That  
May Be Expected In The Fort Irwin Reservation

<u>Common Name</u>	<u>Scientific Name</u>	<u>Status</u>	<u>Agency**</u>
<u>Mammals</u>			
*Mojave ground squirrel	Citellus mohavensis	Rare	Calif., USDI
<u>Birds</u>			
Prairie falcon	Falco mexicanus	Rare	USDI
<u>Reptiles</u>			
Desert horned lizard	Phrynosoma platyrhinos	Undetermined	BLM
Desert tortoise	Gopherus agassizi	Protected	Calif.
Banded gecko	Coleonyx variegatus	Undetermined	BLM

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\* USDI = United States Department of the Interior; California = California Department of Fish and Game; BLM = Bureau of Land Management.

### A2.8.3 Wildlife Management Plan for Fort Irwin

In 1964, a Cooperative Plan for the Conservation and Development of Wildlife on the Fort Irwin Military Reservation, California, was made between the California Department of Fish and Game, the U.S. Bureau of Sport Fisheries and Wildlife and the commanding officer at Fort Irwin. Subsequently, Wildlife Management Plan was prepared by the California Department of Fish and Game. The principal actions under this plan have been the preservation of 12 springs for wildlife habitat enhancement and the installation of six guzzlers (wildlife water devices) at sites on the reservation where there would be no interference with military reservations. California Department of Fish and Game biologists tour the springs on Fort Irwin on an annual basis to clean them out, improve water flow and observe usage by animals.

According to Bob Vernoy, California Department of Fish and Game, a major problem with carrying out the intent of the wildlife management plan has been the relatively high turnover of military personnel who have been responsible for implementing the plan. One solution to this problem would be to assign the responsibility to a civil servant attached to the military base who would be able to provide some year-to-year continuity in the administration of the wildlife management plan.

### A2.9 NOISE

The general perception of the desert's noises is that of silence. Desert sounds typically represent the antithesis of the noise environment of urban life. This silence, which adds to the feeling of solitude natural to the lands and spaces of Fort Irwin, has been interrupted over the years with each military training exercise conducted on the base. The major forms of interruption have included ground maneuvers by Army tactical vehicles, weapons artillery firing, air operations including supersonic activities, air to ground gunnery exercises and a general increase to supply and transportation channels to Fort Irwin during such exercises. Table A-14 lists average noise levels for various activities and their relevance to human comfort.

Except for occasional sonic booms generated from the supersonic air corridor which cover the southern section of the base, these disturbances have generally not drawn the public's interest because of the physical separation the Fort enjoys from any areas, other than the cantonment, of concentrated populations.

San Bernardino County has adopted noise quality standards which are listed in Table A-15. The Noise Element of the County General Plan states that:

"Noise Quality Standards are designated for four (4) basic land use activity categories. The first category of land uses is indicated as relatively "insensitive". This classification includes an unusually wide variety of land use activities, public utilities, transportation systems and other noise-related uses. The second category of land uses is indicated as "moderately insensitive", which include general business and recreational uses. The third category is indicated as "sensitive" which consists basically of residential uses. The fourth and last category is indicated as "very sensitive", which includes hospitals, schools, convalescent homes, churches, etc."

Fort Irwin, except for the cantonment area, would fall within the first category of "insensitive" lands and land uses. This is also the case for the lands immediately surrounding the base, with the exception of the Death Valley National Monument which may be considered very sensitive.

Recommended interior peak noise levels (with windows closed) for residential buildings within the County are 50 dB(A) in living areas and 40 dB(A) in sleeping areas.

The County's General Plan also establishes for certain transportation facilities "Special Study Zones" which require, prior to development, approval for any project within the associated noise channels. Fort Irwin is not included in any of these zones. In the Barstow Area, however, "Special Study Zones" do exist around the Barstow-Dagget Airport and the Irwin Road.

#### A2.10 ARCHAEOLOGIC AND HISTORIC RESOURCES

Fort Irwin enjoys a heritage rich in cultural interest. A detailed description of this background is found at the end of Appendix A.

An abundance of archaeologic and historic resources exist in the Mojave Desert, and especially within the boundary of Fort Irwin. Only a few archaeologic sites, however, have been discovered and recorded, as access to the base is controlled. Those known sites are listed in Table A-16, with generalized locations of the site shown on Figure 6 of the text. Many of these are believed to satisfy the criteria for inclusion in the National Register of Historic Places, the State of California Listing of Historic Places,

Table A-14 Acoustical Scale

	<u>dba*</u>
LETHAL	-180-
	-175-
	-170-
	-165-
	-160-
	-155-
	-150-
	-145-
Sonic Boom	-140-
	-135-
THRESHOLD OF PAIN	-130-
Jet Takeoff at 200'	-125-
	-120-
	-115- Discotheque
PHYSICAL DISCOMFORT	-110-
Motorcycle at 20'	-105- Power Mower
	-100-
Freight Train at 50'	-95- Newspaper Press
Propeller Plane Fly-over at 1,000'	-90- Food Blender
	-85- Electric Mixer
Freeway Traffic at 50'	-80- Washing Machine; Alarm Clock; Garbage Disposal; Electric Can Opener
	-75- Office with Tabulating Machines
Average Traffic at 100'	-70- Vacuum Cleaner; Portable Fan
	-65- Electric Typewriter at 10'
	-60- Dishwasher Rinse at 10'; Air Conditioning Unit
	-55-
	-50- Normal Conversations at 12'
Light Traffic at 10'	-45- Refrigerator
	-40-
	-35- Library
	-30-
	-25-
	-20- Motion Picture Studio
	-15-
	-10- Leaves Rustling
	-5-
THRESHOLD OF HEARING	-0-

The unit of sound is the decibel (dB). The loudness of sound is typically measured using a sound meter, the A-Scale of which corresponds closely to the way the human ear perceives sound, thus the sound level for noise evaluations is frequently expressed in dba.

Source: EDAW, 1977.

Table A-15 San Bernardino County Noise Quality Standards

<u>Land Use Categories</u>	<u>dBA Level</u>	
	<u>Day</u> <u>(0701 to 2200)</u>	<u>Night</u> <u>(2201 to 0700)</u>
1. "Insensitive" Land Uses	65	N.A.
2. "Moderately Sensitive" Land Uses	60	N.A.
3. "Sensitive" Land Uses	50	45
4. "Very Sensitive" Land Uses	45	40

Permissible Exceeded Levels Per Hour

5 dBA	May exceed the standard for 6 min./hr.
10 dBA	May exceed the standard for 15 min./hr.
15 dBA	May exceed the standard for 36 sec./hr.

The Land Use Categories by Major Land Use Activities

Insensitive Land Uses

Forestry  
Mining and Extraction  
Natural Open Space  
Undeveloped Lands  
Railways and Terminals  
Transit Systems and Terminals  
Auto Parking  
Raceways and Drag Strips  
Motorcycle Parks  
Rifle Ranges  
Reclamation Projects  
Liquid and Solid Waste Facilities  
Industrial Manufacturing  
Warehousing Utilities  
Wrecking and Salvage Yards  
Construction Yards

Moderately Sensitive Land Uses

Cemeteries  
Country Clubs  
Athletic Clubs  
Tennis Clubs  
Equestrian Clubs  
Scientific Testing  
Professional Research  
Government Services  
Lodges, Community Associations  
Restaurants and Bars  
General Merchandising

Moderately Sensitive Land Uses (continued)

Professional Offices  
Horticulture  
Livestock Farms  
Fishery  
Water Areas

Sensitive Land Uses

Single Family (Detached) Dwellings  
Single Family (Attached) Dwellings  
Multi-Family (Low Rise) Dwellings  
Multi-Family (Mid Rise) Dwellings  
Multi-Family (High Rise) Dwellings  
Dormitories  
Resort Hotels  
Out Patient Clinics  
Pre-Schools  
Motor Inns  
Hotels  
Recreation Vehicle Parks

Very Sensitive Land Uses

Educational Facilities  
Hospitals  
Convalescent Homes  
Theaters  
Wild Life Sanctuaries  
Churches  
Mobile Home Parks



or the State's Points of Historic Interest. General areas estimated to possess a high potential of cultural resources are also delineated on Figure 6.

Fort Irwin's archaeologic resources generally consist of open habitation, rock shelter and quarry sites, all with a strong potential for the existence of petroglyphs, trails, rock alignments, etc. Some known sites include lithic assemblages thought to be older than ten thousand years. The artifacts typically found consist of choppers, flake scrapers, and bifacially flaked "coup de point-like" implements similar to those of the Old World lower paleolithic period.

All known archaeologic sites on public lands are protected by a series of state and federal laws which make it illegal to collect, damage, or destroy any artifacts or archaeological features.

#### A2.11 POPULATION AND DEMOGRAPHIC CHARACTERISTICS OF BASE PERSONNEL

##### A2.11.1 Permanent Post Population

The permanent party stationed at the base consists of a National Guard headquarters unit with an authorization for 52 personnel, the Mobilization and Training Equipment Site (MATES) with 147 personnel, most of whom live off base, and three people who administer the post exchange club system facilities.

Twenty-two employees with 77 dependents live on the base. During annual training exercises for the National Guard, this full time staff is augmented with temporary personnel. They provide the work force necessary to meet maintenance, repair and operational requirements. A similar augmentation is also required when the post is used by the Active Army for tactical armored exercises such as "Bold Eagle 76" which saw 8,000 personnel on Fort Irwin in January 1976.

##### 2.11.2 Transient Use

Between 400 and 2,000 Army Reserve and National Guard personnel currently use Fort Irwin on any given training weekend of which there are 36 throughout the year. Three tank battalions, an armored cavalry squadron, and support elements use the base for weekend training. The majority of these units come from the San Diego, Los Angeles, and San Bernardino-Riverside Metropolitan Areas. Advance detachments from training units begin arriving as early as Thursday prior to a weekend drill.

Table A-16 Recorded Cultural Resources of the  
Fort Irwin Military Reservation (See Figure 7)

San Bernardino County Reference Number	Location	Prehistoric	Historic
381	Cave Spring	Early to late occupation site.	Water-Stock
385	Leach Spring	Early to late occupation site.	Water-Stock- Mining
400*	Bitter Spring	Early to late occupation site.	Water-Stock- Mining
464	Red Pass Lake	Middle period occupation site.	Recent Military
762	Nelson Lake	Early period occupation site.	Recent Military
763	Nelson Lake Dunes	Early period occupation site.	Recent Military
764	Nelson Lake Dunes Quarry	Early Quarry site.	Recent Military
785	Goldstone 1	Early occupation site.	Recent Military
786	Goldstone 2	Early to late occupation site.	Recent Military
838	McLean Lake	Slight Scatter only.	Recent Military
1018	Reece Site	Surface scatter rock circles.	Recent Military
1065	Goldstone	Early to late surface scatter	Recent Military
1068	Campbell 1	Early to middle period occupation site.	Recent Military
1069	Campbell 2	Early to late surface scatter.	Historic Battle
1100	Garlic Springs	Early to late occupational site.	Cattleman's use Stock-Water
3173	Fort Irwin Quarry	Early to late Quarry site.	Recent Military
3367	Langford Lake	Early to middle period occupation site.	Recent Military
3368	Avawatz Mts. 1	Early to late occupation site.	Recent Military
3369	Avawatz Mts. 2	Early to middle period surface scatter.	Recent Military

\* Listed by the State of California as a Point of Historical Interest.

During annual training, approximately 12-15,000 troops rotate through Fort Irwin in five training sessions. These usually occur during the summer months and last for a two-week duration each.

Also the active Army intermittently uses the Fort for armored exercises. In fiscal year 1978, two brigades of 4,000+ troops each will rotate through Fort Irwin for one month exercises. In addition, U.S. Army Readiness Command plans an exercise titled EW/CAS which will occur in three phases over a 5-month training period and involve from 1,600 to 9,000 ground troops.

In fiscal year 1979, there will be three brigade rotation exercises sponsored by Forces Command at Fort Irwin and a Division Restructuring Exercise which will involve approximately 20,000+ ground troops.

## 2.12 LAND USE

### 2.12.1 Fort Irwin

#### A. History

Since its opening in 1940, Fort Irwin has been deactivated twice, undergone three name changes, and trained military personnel for three wars. Originally conceived as the Mojave Anti-Aircraft Range later to become, because of its physiography, an armor and desert training center under the name of Fort Irwin, it has been in various levels of use for 29 of the last 37 years. The latest partial inactivation occurred beginning January 1971 when the U.S. Sixth Army, for budgeting concerns, deactivated the post to a maintenance status. In March, 1972 a right-of-entry to the post was obtained by the California Army National Guard. Full responsibility for the operation of post was assumed by the State of California on September 1, 1972.

Fort Irwin's current mission is to be retained in a ready status in order to facilitate mobilization requirements, to provide intermittent use for active Army armored exercises, and to fulfill weekend and annual training requirements of Army Reserve components.

Fort Irwin should not be considered by any means a new unused military reservation. Of the 1,006 buildings and structures on base, roughly one-half acre of World War II construction. Some of the off road trails existant today are permanent marks on the desert landscape developed over years of use by tactical vehicles on maneuvers.

B. Land Utilization

(1) General

The Fort consists of 642,582 acres of land, just a little over 1,000 square miles. Except for widely dispersed school lands owned by the State of California and leased to the Army for \$1/acre/year, totalling 21,201.23 acres, the Federal Government obtained the land by withdrawing it from public domain during World War II. All portions of the installation are utilized with roughly 85% of the acreage serving as maneuver areas for training operations, buffer safety zones, or artillery impact areas.

Several government and private organizations maintain formal use agreements with the Army for various land-related activities. These interests, the respective land uses, and acreage involved are outlined in Table A-17. Figure 7 depicts land ownership and infrastructure at Fort Irwin.

(2) Goldstone Deep Space Communications Complex

This facility, occupying 63 square miles, the southwest corner of Fort Irwin, supports the National Aeronautics and Space Administration in its space flight and deep space programs, as well as serving as a research and development center. It consists of a series of tracking antenna responsible for two-way communications with space craft millions of miles from earth. The complex employs a total of about 450 personnel, all of whom live, at the nearest, in Barstow and who commute to work in carpools over the Barstow-Fort Irwin Road.

The various Goldstone stations are susceptible to radio or electronic frequency interference such as that emitted by the electronic warfare equipment used by the various branches of the military. A listing of recent Radio Frequency Interference occurrences at Goldstone is found in Table A-18, with cover letter.

The Goldstone Complex depends on Fort Irwin for its water supply. It is off limits for military training of ground troops.

(3) Leach Lake Air to Ground Gunnery Range

Located in the northern portion of Fort Irwin. This basin, defined from the rest of the reservation by the Granite Mountains, is used by the Air Force on a non-cost basis, for air-to-air and air-to-ground gunnery. Aircraft from George Air Force Base utilize the area on a weekday basis throughout the year. Fort Irwin has 24-hour reclamation rights on the southern portion of this area.

Table A-17 Tenants of Fort Irwin\*

Organization	Expiration Date	Instrument Number	Acreage	Use
State of California, California National Guard	License Aug. 31, 1977 (renewal in progress)	DACA09-3-73-85	595,226.139	-
Aerojet Ordinance and Manufacturing Company	License Oct. 1, 1979	DACA09-3-76-315	-	For use of firing ranges
Camp Irwin Housing, Inc.	Outlease Nov. 17, 2015	DA(5)-04-203- ENG-1180	68.04	Capehart Housing
Commissioner of Education, Department of Health, Education and Welfare	Permit Indefinite	-	15.31	Fort Irwin School
Continental Telephone	Outlease Aug. 31, 1981	DACA09-01-73-304	8.15	To construct a building for housing microwave facilities
Continental Telephone	Outlease Aug. 31, 1981	DACA09-01-73-305	-	For use of telephone poles between Barstow and Fort Irwin
Continental Telephone	Lease Aug. 31, 1981	DACA09-01-76-497	-	To operate and main- tain a 25 pair cable on 73 government owned poles
FMC Corporation	License Dec. 31, 1978	DACA09-3-76-298	-	For use of firing ranges
National Aeronautics and Space Administration	Permit Dec. 31, 1985	DA-04-353-ENG-8863	43,010	Goldstone Deep Space Communication Complex

Table (continued)

Organization	Expiration Date	Instrument Number	Acreage	Use
National Aeronautics and Space Administration	Permit	DACA09-4-72-239	2.29	Utility lines and poles
National Aeronautics and Space Administration	Permit	DACA09-4-72-385	3.5	Communication power-lines and service roads
National Aeronautics and Space Administration	Permit	DACA09-4-72-413	.23	Collimation facility on Tiefert Mountain
National Aeronautics and Space Administration	Permit	DACA09-4-75-30	.056	Bypass Road
Northrop Corporation	License	DACA09-3-74-210	6,400	Developing ordinance, munitions and weapons
Southern California Edison	Easement	DA04-353-ENG-9207	7.3	-
Southern California Edison	Easement	DACA09-2-67-74	13.85	R.O.W. for maintenance of electrical transmission line
Southern California Edison	Easement	DACA09-2-71-284	69.26	-
Xerox Electrical-Optical Systems	License	DACA09-3-77-199	-	For use of firing ranges
Department of the Air Force, George Air Force Base	Permit	DACA09-4-76-355	-	-
Department of the Air Force Write-Patterson Air Force Base	Permit	DACA09-4-76-356	-	-
Air Force	-	-	137,200.00	Air to air and air to ground gunnery

\* Source: United States Corps of Engineers, Los Angeles District Office.

Table A-18

Radio Frequency Interference (RFI) Occurrences at  
Goldstone Deep Space Communications Complex

## RFI/EMI Tabulation

Calendar Year 1976				
Month	Category			
	RFI External Incidents	EMI Internal Incidents	Unknown Incidents	Total
Jan	0	2	5	7
Feb	6	6*	13	25
Mar	0	2	5	7
Apr	1	3	4	8
May	0	2	2	4
Jun	0	0	5	5
Jul	0	0	0	0
Aug	0	1	9	10
Sep	0	0	8	8
Oct	5	0	1	6
Nov	4	3	3	10
Dec	0	2	4	6
Avg/mo.	1.1	1.8	5	8

\*This source reported 6 times until parts received to repair.

## Calendar Year 1977

Jan	0	1	1	2
Feb	0	3	0	3
Mar	1	2	0	3
Avg/mo	.33	2	.33	2.7

Apr	1	4	3	8
May	2	2	0	4

During the first 3 months of calendar year 1977, there have been a total of 8 RFI/EMI incidents. When comparing this to the 40 incidents during the first 3 months of calendar year 1976, the conclusion is that there has been an obvious reduction in the RFI/EMI environment of the GDSCC.

If we break down the RFI/EMI incidents by month and by the categories of RFI external, EMI internal, and Unknown; it is seen that the major reductions have taken place in the RFI external and the Unknown categories with the occasional EMI internal incidents which occur at the GDSCC remaining at a low relatively constant level.

This leads me to believe that the incidents of RFI classified as RFI external and Unknown are being reduced by coordination with and the education of agencies using airborne emitters near the GDSCC.

Attached is an RFI/EMI Tabulation of the RFI incidents occurring at the GDSCC from January 1976 through March 1977.

*B. A. Gaudian*  
B. A. Gaudian  
GDSCC RFI Coordinator

#### (4) Airfield Facilities

Within the limits of the Fort Irwin military reservation, there are two established airstrips. Often, for large exercises, Barstow-Daggett Airport is utilized for maintenance of aircraft and as a supply depot.

##### (a) Bicycle Lake Army Airfield

Located approximately three miles north of the cantonment area this airfield has been superimposed on a playa (dry lake bed) known as Bicycle Lake and consists of the following facilities:

- A north/south runway 9,000 feet in length.
- An east/west runway 5,000 feet in length.
- An emergency runway of 3,500 feet running east/west at the south end of the lake.
- Operations buildings, tower and maintenance hanger.

The runways are lighted, but are not paved. They must be graded after rains and after landing of heavy aircraft such as the C-130 Hercules air transport. The playa floods following heavy summer rainstorms and during the November to March rainy season which regularly dictates closure of the airfield. As much as six to 10 inches of water cover the main runways for periods as long as 90 days.

##### (b) Miller Airfield

Located on a playa known as Goldstone Lake in the southwest corner of Fort Irwin and within the lands leased to the National Aeronautics and Space Administration, this 6,500 foot dirt runway is surrounded by a series of natural and defunct man-made features. This renders it extremely hazardous for landing large aircraft. The National Aeronautics and Space Administration does utilize it frequently, however, for shuttle service from the Goldstone Complex to their facilities elsewhere in Southern California. This playa is also subject to intermittent flooding.

The paved parade field located within the cantonment area serves also as a multi-helicopter landing pad. It is not lighted.

The closest military airfield to Fort Irwin is George Air Force Base located just west of Victorville, California (See Figure 12). It is approximately 70 miles from Fort Irwin.



(5) Ammunition Storage

The Ammunition Supply Point west of the cantonment area near the Goldstone Road is operational throughout the year to provide ammunition to units during weekend training and annual training. It comprises approximately 100 acres and is adequate to store all types of conventional munitions. It contains 34 bunkers totalling 87,150 square feet. Approximately 800,000 tons of munitions could be in storage at one time.

(6) Mining

A few mining claims exist within the post boundaries. These are shown in Table A-19.

Table A-19. Mining Claims

<u>Map Identification Number</u>	<u>Owner</u>	<u>Acreage</u>	<u>Conditions</u>
1	Inez L. Spaulding	20.66 (Lease)	1 unpatented valid load mining claim terminated 05/10/47.
2	C. S. Van Doren	20.66 (Lease)	1 unpatented valid load mining claim.
3	Estate of E. E. Williams	37.00 (Lease)	Implied lease for 4 unpatented load mining claims.
4	State of California	20.58 (Lease)	1 patented load mining claim.
5	State of Californis	40.35 (Lease)	2 patented load mining claims.
6	Dr. Roy Hunlley Chapin	20.66 (Lease)	1 unpatented valid load mining claim.
7	Dr. Roy Hunlley Chapin	20.66 (Lease)	1 unpatented valid load mining claim.

(7) Road System

There are presently 99+ miles of asphalt roads and 45+ miles of graded surfaces within the base which connect the cantonment area with Barstow, the Goldstone Deep Space Center, the Bicycle Lake Airfield, and all outlying ranges and maneuver areas. From this network, an extensive system of cross-country trails and tracks has been created after 30 years of tactical maneuvers by a full range of Army tracked vehicles.

#### (8) Utilities

Electricity is purchased from the Southern California Edison Company and supplied through a post substation with an average consumption rate of 5,000,000 kilowatt hours per year. The electrical power source is one 115 kV, 3-phase, 60-cycle, aerial transmission line from a Southern California Edison owned steam generator plant to a substation located at the Irwin Road and Pickering Road Intersection on the reservation. A 34.5 kV, 3-phase, 60-cycle aerial transmission line runs from the Pickering Road Substation to the post substation within the cantonment area. This also is owned by Southern California Edison. The post substation utilizes a government-owned distribution system.

No electrical power is distributed to the ranges. When needed, it is supplied by generators.

The Petrolane Corporation provides liquid propane gas to the post which is stored in two 30,000-gallon tanks owned by the contractor. The post averages annually about 665,000 gallons of propane. Gas is shipped to the post by motor transport. The storage tanks are located at the southeast limit of the cantonment area.

#### (9) Ranges and Maneuver Areas

Figure 8 shows ranges and maneuver areas at Fort Irwin. Fort Irwin has 24 basic firing ranges, most of which are temporary in nature, capable of accommodating all conventional weapons in the current inventory of the Army. Many of these are sometimes combined during large brigade operations to form, under a different range name, areas compatible for such maneuvering. Of the total reservation acreage, approximately 85% is utilized as maneuver areas of one form or another. Maneuvers are restricted only on NASA lands, live-fire target areas called impact areas, playas, and springs, two of which are historical monuments.

There are currently two general types of ranges on the Base: Fixed Point Ranges and Fire Maneuver Areas. These are listed in Table A-20 and shown on Figure 8. Tactical training requires the complete use of the fire and maneuver areas illustrated. When a tactical unit is of company size or larger, the lands shown within the range fans, up to and in some cases beyond the reservation boundary, are used for maneuvering. Although there are impact zones delineated which typically contain a high occurrence of unexploded ordnance, there is a likelihood that occasional "duds" could be found, after 37 years of use, anywhere within the base or immediately beyond its perimeter. The only impact zone

Table A-20 Ranges

FIXED POINT RANGES

<u>MAP REFERENCE NUMBER</u>	<u>NAME</u>	<u>CAPABILITIES</u>
1	Pistol Range	18 firing points at 10, 15 and 25 meters. Cal 22, 38 and 45.
2	Known Distance Range	50 firing points at 100, 200 and 300 yards; 25 firing points at 500; M14 and M16 Rifle.
3	Sub-Machine Gun Range	-
4	Rocket Launcher	Qualification fire and assault fire, 4 firing points, 40mm, 66mm.
5	Goldstone Sub-Caliber Range	20 firing points, Cal .30, .50, 7.62mm, 5.56mm; MG, M16 & M14 Rifle.
6	Dry Gulch Mortar Range	All firing tables for 4.2 and 81mm mortars, 106RR. 4 firing points, night fire, Rifle familiarization M16.
7	Tarantula Range	Infantry squad or platoon tactical range, non-fire exercises.
8	Scorpion Range	Infantry squad or platoon tactical range.
9	Lizard Range	Infantry squad or platoon non-fire exercise.
10	Coyote Canyon Range	Scout, Cal .30, 50 and 7.62mm.
15	Lucky Fuse	Utilized in conjunction with Nelson Pass for Helicopter Gunnery. All direct fire weapons, all heat ammunition.
16	Machine Gun Field Fire Range	10 firing points, suitable for MG transition (modified) and MG field fire. Tables III, IV and V for Cal .50 spotting rifle, III and IV Cal .50 HMG.

Table Ranges (continued)

Tank qualification and familiarization ranges: These are to be used simultaneously without interference with each other.

<u>MAP REFERENCE NUMBER</u>	<u>NAME</u>	<u>FACILITIES</u>	<u>CAPABILITIES</u>
17	Moving Target Range		10 firing points, suitable for tank Table V. Motor powered target cars. 76mm, 90mm, 105mm tank. (AP-TP-T only).
18	East Range 1		10 firing points. Sub-caliber tank gunnery Tables I, II and III, Cal .30 MG, .50 MG and 7.62mm MG. Also Tables I and II for 106mm RR.
19	East Range 2	Classroom, Mess Hall, Latrine, Tower	10 firing points, Table IV tank gunnery and Table V for 106mm RR, 76mm, 90mm, 105mm tank, 4.2" mortar (illumination only).
20	East Range 3	Classroom, Storage Room, Latrine, Tower	10 firing points. Tables I, II and III for tank gunnery and Tables I and II for 106mm RR. Cal .30 MG, .50 Cal spotting rifle, 7.62mm rifle.
21	East Range 4	Classroom, Mess Hall, Latrine, Tower	5 firing points. Table IV for tank gunnery, Cal .30, .50 and 7.62mm MG; 4.2" mortar (illumination only).
22	East Range 5	Latrine, Mess Hall, Latrine, Tower	10 firing points. Tables I, II and III for tank gunnery and for 106mm RR. Cal .30 MG, Cal .50 spotting rifle, 7.62mm.
23	John Miller	Classroom, Mess Hall, Latrine, Target Shed	Tank crew proficiency course. Table VIII or VI one firing lane with covered return route. Two electrical powered target cars. 76mm, 90mm and 105mm tank. Cal .30, .50 MG, 7.62mm MG, 4.2", 81mm mortar. HE, HEP, HEAT, TPT, SHOT. All types MG ammo. Mortar fire, illumination rounds only.

Table Ranges (continued)

<u>MAP REFERENCE NUMBER</u>	<u>NAME</u>	<u>FACILITIES</u>	<u>CAPABILITIES</u>
24	Summit Grave		Tank Crew Proficiency Course. Table VII. 76mm and 90mm tank. Cal .30, .50 and 7.62mm MG; 81mm and 4.2" mortar; 7.62mm, .50 Cal MG.

With the exception of J. M. Miller and Summit Grave Ramos, all of the ranges are of temporary construction and require considerable maintenance.

#### Five Maneuver Areas

Certain areas are set aside for major maneuvers which involve either simulated or live-fire exercises. They can be combined to support an opposing brigade sized exercise without excessive restrictions.

<u>MAP REFERENCE NUMBER</u>	<u>NAME</u>	<u>CAPABILITIES</u>
11	Rockpile	Utilized for tank company in the attach Phases I and II. Cal .30, 50 and 7.62mm, MG, 4.2", 81mm.
12	Garry Owen	Suitable for tank platoon and company live fire tactical training. May be used for battalion to brigade live fire exercise when joined with Nelson Pass and Granite Pass. Cal .30, .50, 7.62mm MG; 90mm, 195mm tank; 106mm RR; 81mm and 4.2" mortar.
13	Granite Pass	May be used for platoon or company live fire tactical training. If joined with Garry Owen and Nelson Pass Ranges, may be used for battalion to brigade live fire exercises. All types MG's, mortar, HOW, tank guns, except Sabot.

Table Ranges (continued)

<u>MAP REFERENCE NUMBER</u>	<u>NAME</u>	<u>CAPABILITIES</u>
14	Nelson Pass	Used for Helicopter Gunnery. Suitable for tank platoon and company live fire tactical exercises. May be joined with Garry Owens and Granite Pass for use as a battalion to brigade live fire exercises. Cal .30, .50, 7.62mm MG; 76mm, 90mm, 105mm tank; 106mm RR; 81mm and 4.2" mortar.

which is currently active is "Lucky Fuse". The remaining impact areas have been cleared over the past few years and are now open for tactical maneuvers.

Some range and maneuver areas are considerably distant from the cantonment area. They are not guarded and, as such, they are subject to theft and vandalism. Also, because of openness and distance, four-wheel drive recreation vehicles often enter the reservation from the peripheral resource lands of the Bureau of Land Management.

#### (10) Cantonment

Eighteen hundred acres, or less than 1% of Fort Irwin reservation is devoted to the cantonment area. Administration, maintenance, supply and housing facilities, plus all cultural and social services are grouped together here to form a hub for Fort Irwin activities.

With a small permanent post population, only those facilities necessary to accommodate the number of troops present at any given point in time are active. During those times, services are sometimes intermittent. For example, the post-exchange gasoline station, during summer annual training exercises for the National Guard, operates some days for only one hour.

Figure 9 depicts the cantonment area, and Table A-21 summarizes the base's facilities, most of which are within the cantonment area. Many of the buildings are old and were not constructed as permanent facilities.

#### (a) Housing

A total of 506 permanent family housing units exist on the post. Seventy-eight units were built for officers and 428 for enlisted men. Currently, 22 units are occupied with the remaining quarters sealed up and under maintenance. Unlike the rest of the post, this area is not currently under license with the State of California, but is the responsibility of Fort Ord. The houses were built between 1961 and 1966. Many additive items, such as garages and storage areas were omitted in the original construction by fund limitations.

Also available are 88 trailer sites served with the necessary utilities.

A total of 226 Bachelor Officer Quarters exist. Of these, 90 are permanent spaces. A total of 3,428 spaces exist for enlisted troop facilities of which 912 are permanent. Many of these do not meet current "Volunteer Army" standards.

Table A-21 Base Facilities

Buildings: 842

Miscellaneous Structures: 264

Supply and Storage Areas: 196,952 square feet warehouse storage  
1,058,148 square feet outside storage

Enlisted Billeting Areas:

Enlisted Men Barracks:	35 buildings of 68 EM ea.	2,380 spaces
Enlisted Women Barracks:	2 buildings of 50 EW ea.	100 spaces
Senior Enlisted Quarters:	1 building of 36 EM ea.	36 spaces
Enlisted Men Barracks:	3 buildings of 304 EM ea.	<u>912</u> spaces

Total Enlisted Personnel Billets: 3,428 spaces

Officer Billeting Areas:

Field Grade Officer Quarters:	1 building of 30 Off.	30 spaces
Field Grade Officer Quarters:	1 building of 60 Off.*	60 spaces
Company Grade Officer Quarters:	4 buildings of 34 Off.*	<u>136</u> spaces

\*Based on double occupancy

Total Officer Billets: 226 spaces

Family Housing Units: 506 units

Trailer Spaces: 88 each

Dining Facilities: Company Size 18 each  
1000-Man Consolidated 1 each

Maintenance Facilities:

Company/Battalion Size:	14 buildings
Post Maintenance Facility:	13 buildings consisting of approximately 850,000 square feet.

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SOURCE: House Appropriations Committee, Surveys and Investigations Team  
Visit; June, 1976



(b) Social Services

Within the cantonment area, a series of recreation and cultural facilities exist in various states of operation and maintenance. For example, when the Base was deactivated in 1970, the Army took with them six of the 10 bowling lanes and discontinued maintenance of a golf course to the east of the cantonment area. Recreation services are currently operated on a schedule phase with general duty hours. A listing of the facilities provided by the Base is found in Table A-22.

(c) Medical

A relatively new completely equipped 24-bed hospital exists in the cantonment area. It is currently mothballed and inspected for readiness by medical personnel from Fort Ord.

The post currently operates a dispensary during annual training and inactive duty/weekend training periods. Seriously injured personnel are transported to other military hospitals, either by helicopter or vehicular ambulance for treatment.

The closest military hospital is at the Marine Corps Supply Center in Barstow or George Air Force Base in Victorville.

(d) Education

A grade school, currently inactive, is located in the midst of the post family housing area. Previously operated by the Barstow Unified School District, the school is capable of supporting classes from kindergarten through eighth grade. It contains 15 classrooms, two kindergarten rooms and a library.

High school students have historically attended John F. Kennedy Memorial High School in Barstow. The post has in the past provided bus transportation. Currently, however, all school age children living on post are bused by the School District with funding provided by the U.S. Department of Health, Education and Welfare.

C. Airspace

The airspace over Fort Irwin is restricted from ground level to infinity and roughly parallels the fort's real estate boundaries. It is under the direct control of Fort Irwin and is currently used by George Air Force Base, the National Aeronautics and Space Administration's Goldstone Tracking Stations and Army Reserve Components. The Air Force operates

Table A-22 Recreational/Social Service Facilities

	Year Built	T = Temporary P = Permanent
<b>Post Exchange</b>		
Retail Store (18,567 sq. ft.)	1963	P
Commissary (10,460 sq. ft.)	1968	P
Service Station	1963	P
Retail Branch (8,670 sq. ft.)	1955	T
Snack Bar (1,000 sq. ft.)	1968	P
Unit Chapel	1944	T
Post Chapel	1968	P
Post Office	1968	P
<b>Park</b>		
Hospital (24-bed)		P
Theater and Stage (500 seats)	1965	P
Officers Club	1942	P
Non-Commissioned Officers Club	1944	T
Enlisted Mens Service Club	1944	T
Enlisted Mens Service Club	1953	T
Baseball/Football Field With Bleachers	1944 & 1954	T
Little League Baseball Field	1967	P
Tennis Courts	1944 & 1959	T
Handball Courts	1968	P
Golf Course Clubhouse	1962	P
Bowling Center	1967	P
Gymnasium	1958	T
Swimming Pool	1944	T
Swimming Pool and Bathhouse	1968	P

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Source: Real Property Information Schedule, May 1977: AR 210-20  
Fort Irwin, California.

daily air-to-air and air-to-ground firing over those lands leased to them in the north end of the fort. The Goldstone Tracking Station uses its airspace area 100 percent of the time, as its radar operates 24 hours, seven days a week. The Reserve Components, mainly California Army National Guard, utilize the remainder of the airspace on weekends and during summer training periods.

A supersonic air corridor passes from east to west over the southern portion of the reservation. Sonic booms from this have been the probable cause for some structural damage (such as cracked walls and broken windows) within the cantonment area and Goldstone Deep Space Communication Complex.

#### D. Supply

Supplies and materials are generally received at Fort Irwin by three modes of transportation: commercial van; railroad to various points in the Barstow area, then by commercial or military vehicle; and priority shipment by commercial air to Los Angeles with either commercial or military transport.

##### (1) Surface Routes to Fort Irwin

The only public entrance to Fort Irwin is through Barstow and over Irwin Road. It is 37 miles long and for the most part has a 22-foot pavement width with six foot wide shoulders. San Bernardino County maintains 28 miles of this access road and the post maintains nine miles within the reservation. The road has been subject to closure in the past during heavy rainstorms causing inundation at certain locations. As the road crosses the Calico Mountains, its generally straight alignment sharply alters through Jackhammer Gap with a series of tight curves. Except for the transportation of tracked vehicles and occasional air shipments into Bicycle Lake Army Airfield for large-scale active Army tactical exercises, all supply to the Base is trucked over this road.

A variety of unpaved desert trails enter the reservation from natural resource lands under the control of the Bureau of Land Management. The reservation is off limits to unauthorized civilian personnel and posted accordingly. There have been, however, occasions when off-road recreation vehicle uses have infringed onto the Fort.

##### (2) Rail Service

There is no direct rail service to Fort Irwin. In the past, four railroad sidings have been used for shipments of freight to and from the fort.

- (a) At Mannix, there is a siding with a single concrete end loading ramp which can accommodate 20 to 26 railroad cars, depending on the length of the cars. Sand in the area does not permit the use of forklifts. There is no lighting. The Mannix siding is used by the fort for the shipment of tracked vehicles. The route from the siding to Fort Irwin is 27 miles long across desert terrain.

The Army maintains a series of easements where this route crosses privately owned lands. The Mannix siding is approximately 55 miles from Fort Irwin over available paved highways.

- (b) Under a cross-service agreement, the use of railroad sidings at the Marine Base in West Yermo is permitted on a space available basis. This location, 45 miles from the post, has the capability of handling bilevel and trilevel railroad cars and can be used as a service point for extra wide and heavy loads.
- (c) The siding referred to as the "Team Track" at the main railroad yard in Barstow has been used when less than carload shipments are involved and when a forklift is necessary. This siding is 38 miles from the post.
- (d) "Waterman's Spur", a 22-car capacity rail siding, with an end ramp, is located close to a residential area of Barstow, 38 miles from Fort Irwin. There is no lighting and there is a history of complaints from local residents over usage of this siding.

#### 2.12.2 Periphery and Related Land Uses Within The Region (See Figure 10)

##### A. Pubic Lands/Bureau of Land Management

The acreage around the north, east and south perimeter of Fort Irwin are ;amds under the control of the Bureau of Land Management. These lands have been categorized into three restrictive recreational use designations as part of the Bureau's Interim Management Program for the California Desert. These are:

- o Restricted - Designated Roads and Trails. Recreation vehicle travel is permitted only upon those roads and trails designated by the Bureau.
- o Restricted - Existing Roads and Trails. Recreation vehicle travel is permitted only upon existing roads and trails defined as public ways habitually travelled by vehicles and which are clearly visible and have evidence of previous use.

- o Special Design. Plans are to be prepared to provide for vehicle use and related facilities such as camping areas and access roads. Until plans are completed, vehicle use is permitted only on existing vehicle routes.

Final land management plans for these lands are not expected to be completed until 1980<sup>1</sup>.

#### B. Naval Weapons Center

The Mojave "B" - Randsburg Wash Test Range complex, 487,308 acres, is part of the Naval Weapons Center located at China Lake west of Fort Irwin. The eastern perimeter of the Test Range abuts Fort Irwin. The mission of the Naval Weapons Center is to "establish and maintain the primary (although not necessarily exclusive) in-house research and development capability for the following Navy and Marine Corps systems, subsystems and technologies:

- Strike aircraft/weapon systems and concept development.
- Air-launched weapons and associated avionics systems.
- Tactical missiles.
- Subsystems for weapon systems defined above.
- Strike warfare countermeasures.
- Weather modification."

Similar in natural character to Fort Irwin, this range has been used in the past for Joint Training Military Exercises in conjunction with Fort Irwin lands.

#### C. United States Marine Corps Supply Center

Located east of Barstow, the supply depot's mission is to procure, distribute, and supply all Marine Corps elements west of the Mississippi with Marine Corps unique items. Due to this charge, the Post Exchange, open to Fort Irwin personnel, offers a variety of goods for sale not found in the typical inventory of those post exchange facilities at Fort Irwin operated by the Army and Air Force Exchange Service.

The depot is currently expanding its work force by 100 to 200 personnel.

#### D. Calico Ghost Town

Calico Ghost Town is a major park attraction in the area. In 1976, Calico had a total attendance of 333,425 visitors, or 36 percent of the total attendance in the entire San Bernardino County Regional Parks System. Almost half the visitors to the park according to a recent survey, are from Los Angeles County or out-of-state. Only six percent were from the desert communities of San Bernardino County.

#### 2.12.3 Land Use -- City of Barstow

The City of Barstow contains 13,316 acres (20.8 square miles) of land, including acreage in highway rights-of-way. More than 10,000 acres, or 75 percent are vacant. More than 40 percent of the city is zoned residential; 72 percent of this is undeveloped. Another 23 percent of the city is zoned industrial, with 58 percent of this amount untenanted. Over one-third of the industrial lands developed belong to the Santa Fe Railroad. More than half of the commercial zoned acreage and virtually all of the agricultural zoned land is vacant.

In general there is more than adequate room in Barstow for expansion in all areas of land use development provided other planning criteria are met.

#### A2.13 ECONOMIC CONDITIONS OF THE BARSTOW AREA

##### Introduction

This report section characterizes the existing economic and demographic climate and conditions pertinent to the proposed reactivation of Fort Irwin. This characterization is primarily drawn from statistical tables reflecting the data form in which this information is typically available.

The tables are classified into three major groupings: population, employment, and housing. Within each grouping, the discussion is further refined in terms of both relationships to the regional context and to the greater Barstow area. Standard definitions apply to all statistical or demographic terms or topics. The geographic context of the statistical presentations, however, varies according to availability of information and locational relevance. For example:

- o Population and employment on a regional basis are discussed either in terms of countywide statistics or, in some instances, the two county Riverside-San Bernardino area commonly referred to as the Riverside-San Bernardino-